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WIDEST SENSE

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PHOTO—SCIOGRAPH OF A HUMAN HAND.
MADE WITH ROENTGEN RAYS.

BY PROF. DR. SLABY,
CHARLOTTENBURG, GERMANY.

AMERICAN JOURNAL
OF
PHOTOGRAPHY

THOS. H. McCOLLIN, Managing Editor.

JULIUS F. SACHSE, Editor.

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THE ROENTGEN (X) RAYS.

WITHIN the whole range of photographic history nothing has ever created so great a sensation as the announcement that rays or waves had been discovered that would penetrate bodies opaque to ordinary light and were actinic enough to impress a shadow upon a sensitive plate.

The first public intimation of this discovery was heralded far and wide by the sensational press in England and America, giving the credit to a thus far unknown and unheard of scientist in Germany.

These highly colored statements, vague as they were, were received with doubt and distrust by most all intelligent readers. Reports, however, were soon received from apparently trustworthy sources in Germany that seemed to confirm the published accounts, supplemented as they were with proof that the bones of a human hand had been photographed through the integuments and appeared plainly upon the plate, while the surrounding tissues merely showed a light penumbral shadow.

This proof at once set most all physicists, scientists and photo-students, so to say, wild, and the rush commenced for suitable apparatus for experimental purposes.

Nor was the sensational press slow to take hold of the situation and fan the spark into a flame. Column after column descriptive of the wonderful new photography has been published daily,

illustrating the miracles performed by the new and magical rays. For the nonce the old staple stock tales of color photography and the reproduction of natural colors have all been relegated to the rear.

The daily papers in all the great centres have vied with each other to see which could furnish the most sensational accounts of wonderful experiments, many of which, by the way, had no foundation whatever in fact. Unfortunately many of the ignorant and unsophisticated readers received these wild statements for actual truth, and like the old fable of the "Three Black Crows," were soon magnified into tales, beside which the wonders of the "Arabian Nights" paled into insignificance.

Among the many miracles said to have been performed by aid of these wonderful X rays were such as the tempering of soft metals by merely photographing through them. Another case where a drowned mouse was laid upon a plate-holder under the rays, and after a short exposure the mouse came to life and scampered off, merely leaving the shadow of its skeleton impressed upon the plate within the holder.

Then, again, where forty-two large buckshot were located in a boy's hand by aid of the new photography. From Chicago comes the account where a young woman sitting for a picture in a gallery the operator, unknown to her, turned on the X rays, with the result that the plate showed only her articulated skeleton, with a malformation of the ribs caused by tight lacing. According to the same veracious correspondent, a company is now being formed in that city for the manufacture of an impervious metallic cloth so as to prevent any illegal use of the new X rays. We also hear of a company being formed in Colorado to prospect for gold and precious ores by aid of what is designated as a Roentgen X Ray Camera.

To cap the climax, however, a bill was introduced into the New Jersey Legislature, at Trenton, Feb. 19th, 1896, by Assemblyman Reed, of Somerset county, "prohibiting the use of X rays in opera glasses in theatres or other public places."

However, leaving the ridiculous statements of the sensational press to the unsophisticated and gulible reader, who delights in

ghost stories, we will turn to the serious aspect of the great discovery, for such it is, of Wilhelm Conrad Roentgen, Professor of Physics at the University of Wurtzburg, Germany.

Unfortunately, thus far there is nothing whatever in the discovery that will benefit the professional photographic portraitist in his legitimate calling. Strictly speaking the process is not photography in any sense of the word. The much used term "new photography" is certainly a misnomer,—perhaps the true designation would be sciography or photo-sciography. Just what use these new rays will prove to photographic science cannot be foretold. In view of the general experimental research that is now going on all over the civilized world, the results cannot even be hinted at. The same is the case from a scientific standpoint. It is impossible to foretell what the future may bring forth. The new force or energy will no doubt make itself felt in many branches of the physical sciences. As an illustration, it is but necessary to mention the following practical test:

Prof. Roentgen exposed to the X rays a large metal plate that had been broken and afterward welded together, and as the strongest ordinary light showed no sign of fracture, a sensitive plate was brought into requisition, and after exposure and development the line of juncture was shown distinctly.

The further developments of this new discovery, stripped from all sensationalism, will be anxiously looked for by the scientific world, and, without doubt, the sensitive dry plate will prove the greatest factor in the development of the wonderful Roentgen rays.

JULIUS F. SACHSE.

The Comparative Standard of Art Here and Abroad.—In a private letter received in Philadelphia, R. W. Vonnoh, the artist, who has been abroad some time, says:

"I sincerely trust that the future of art is in America, and even now the standard there is fully as high in tendency, if not actually better, than over here. I tell you it is a terrible thing for an art community to be steeped in old traditions to such an extent that it will accept nothing new whatever, and that seems to be the London and German status generally."

PHOTOGRAPHING THE VOICE.

REMARKABLE experiments are being carried on at Columbia College by Professors Halleck and Muckey with regard to the tones of the human voice. The object of the professors is primarily to discover a standard for the human voice by which all voices can be judged. They propose to construct a machine which will produce the notes in three octaves, just like a human voice. The only difference will be that the notes from the machine will be pure notes and infinitely more beautiful than any human being can produce.

By means of these perfect, or nearly perfect tones, a standard can be fixed which will represent the human voice in its highest perfection. Incidentally, the way for a singer to get the best effect with the least exertion will be found, beside much other valuable data. In order to do this, photographs have been taken of the vocal cords in a man's throat while he is singing. This was done by means of a laryngoscopic glass. The results gave the position of the cords for each different note.

Musical notes are produced by the vibration of the vocal cords, and their pitch is controlled by the length, tension and thickness of the cords. The experiments already show that the training of the arytenoid cartilage which controls the thickness of the cords plays an important part in voice production. Most singers depend entirely upon the alteration of the length and extension of the cords for singing different notes. The valuable aid of the arytenoid cartilage is not called in, and consequently much greater exertion is required.

Undoubtedly the most interesting experiment, however, is the photographing of the voice itself. The difference between the tones of a good and bad voice when photographed are shown in the negatives. The lines represent the vibration of a flame when a note is sounded close against it. A new complicated piece of mechanism, known as the "mono-metric flame machine," is used to obtain these results.

Every note sounded by the human voice contains a number of overtones in addition to the note itself. When the note "A" is

sung, there are sounded in addition to the fundamental or actual "A" itself, the "A's" of two or three octaves higher, as well as of several intermediate tones. We only hear the note as one sound, but the monometric flame detects eight or nine others and divides the notes up, as shown in the negatives. The upper tones give brilliancy and the fundamental tones give volume and strength.

Now if some of our finest singers can be induced to have their voices photographed in this way the arrangement and number of tones in a single note, which will be as perfect as possible, will be discovered. There is no difficulty in producing these different tones separately by means of tuning forks. If they were all sounded at the same time and in the proper degree of loudness the exact counterpart of a human voice would be produced by mechanical means. This has never yet been done, for the metallic, far-away tones of the phonograph cannot be compared to the real human voice.

Professor Koenig, of Paris, has long been trying to do this, but without success. The great trouble is that the tuning forks cannot all be sounded at once, and of the correct loudness. The note that we hear is, of course, the loudest, and is represented in the photograph by the lowest and thickest line. All the overtones gradually taper off in strength until even the sensitive resonators in the monometric machine cannot detect them.

The man whose voice is to be photographed sings a single note steadily into a large sounding board. From the sounding board the note is conveyed to a row of resonators, eight in number, which are of various pitches, corresponding to the different overtones of the voice. In front of each resonator is a little jet of flame. When the voice tones strike on the resonators the air inside them is vibrated and agitates the little flame which is in front of each resonator nozzle.

The flames are reflected into a many-sided reflector, which is rapidly revolved while the note is being sounded by the man who is sitting for his voice photograph. The lens of a camera is placed close against the reflector and a rapid plate exposed for a second or more. When developed the result shows the vibrations of the man's voice, and consequently its quality. As a rule the better

the voice the more overtones there are in it, and to record a voice like Jean de Reszke's would require a dozen or more flames.

In order to produce the human voice Professor Halleck will use organ pipes. They will be very small and inclosed in boxes, so that no more sound can get out than is needed to produce the complex tone. If the experiments are sucessful and the projected machine can be constructed it will even be possible for a man to sit down in his own drawing-room and play on a piano, the notes of which will not give forth the musical sounds of wires struck by felt and wood hammers, but the glorious melody of a human voice. There will be no need to go to the opera to hear a famous prima donna, because the instrument will sing much better than any human being can. The best points can be taken from a number of the finest singers and the results formed into a scale of notes which will be almost perfect.

Opera will then mean a stageful of voiceless Tristans and Tannhausers, who go through the motions while the singing is done by machine behind the scenes.

Cycling Proverbs —Politeness is like a pneumatic tire; there is not much in it, but it eases many a jolt in the journey of life.

A pleasant disposition, like oil in a bicycle bearing, reduces friction and prevents a world of wear and tear.

Ambition is like a bicycle saddle; though much sat upon, it generally manages to be on top.

The work of the world, like a bicycle, would soon stop, were it not for the cranks.

Like a link in a bicycle chain, we may not amount to much individually, but collectively we make the wheels go around.

Life is like a bicycle run; some worry, fret and scorch along, and soon reach the end, while others take it easy and enjoy themselves as they go.

His Description.—A little boy whose elder sister is much interested in photography and who gives the family the benefit of many observations about her work was taken to the courthouse to see the end of a certain trial. He came home and told his mother about it. "The judge made a speech to the jury," he said, "and then sent them into a little dark room to develop."—*Boston Transcript.*

ON A NEW KIND OF RAYS.*

BY W. K. ROENTGEN.

A DISCHARGE from a large induction coil is passed through a Hittorf's vacuum tube, or through a well-exhausted Crookes' or Lenard's tube. The tube is surrounded by a fairly close-fitting shield of black paper; it is then possible to see, in a completely darkened room, that paper covered on one side with barium platino-cyanide lights up with brilliant fluorescence when brought into the neighborhood of the tube, whether the painted side or the other be turned toward the tube. The fluorescence is still visible at two metres distance. It is easy to show that the origin of the fluorescence lies within the vacuum tube.

It is seen, therefore, that some agent is capable of penetrating black cardboard, which is quite opaque to ultra-violet light, sunlight, or arc-light. It is therefore of interest to investigate how far other bodies can be penetrated by the same agent. It is readily shown that all bodies possess this same transparency, but in very varying degrees. For example, paper is very transparent; the fluorescent screen will light up when placed behind a book of two thousand pages; printer's ink offers no marked resistance. Similarly the fluorescence shows behind two packs of cards; a single card does not visibly diminish the brilliancy of the light. So, again, a single thickness of tin-foil hardly casts a shadow on the screen; several have to be superposed to produce a marked effect. Thick blocks of wood are still transparent. Boards of pine two or three centimetres thick absorb only very little. A piece of sheet aluminium, 15 m.m. thick, still allowed the X-rays (as I will call the rays, for the sake of brevity) to pass, but greatly reduced the fluorescence. Glass plates of similar thickness behave similarly; lead glass is, however, much more opaque than glass free from lead. Ebonite several centimetres thick is transparent. If the hand be held before the fluorescent

* Translated by Arthur Stanton from the *Sitzungsberichte der Wurzburger Physik-medic. Gesellschaft*, 1895. Reprinted from *Nature*, Jan. 23, '96, p. 274.

screen, the shadow shows the bones darkly, with only faint outlines of the surrounding tissues.

Water and several other fluids are very transparent. Hydrogen is not markedly more permeable than air. Plates of copper, silver, lead, gold, and platinum also allow the rays to pass, but only when the metal is thin. Platinum .2 mm. thick allows some rays to pass; silver and copper are more transparent. Lead 1.5 mm. thick is practically opaque. If a square rod of wood 20 mm. on the side be painted on one face with white lead, it casts little shadow when it is so turned that the painted face is parallel to the X-rays, but a strong shadow if the rays have to pass through the painted side. The salts of the metals, either solid or in solution, behave generally as the metals themselves.

The preceding experiments lead to the conclusion that the density of the bodies is the property whose variation mainly affects their permeability. At least, no other property seems so marked in this connection. But that the density alone does not determine the transparency, is shown by an experiment wherein plates of similar thickness of Iceland spar, glass, aluminium and quartz were employed as screens. Then the Iceland spar showed itself much less transparent than the other bodies, though of approximately the same density. I have not remarked any strong fluorescence of Iceland spar compared with glass (see below).

Increasing thickness increases the hindrance offered to the rays by all bodies. A picture has been impressed on a photographic plate of a number of superposed layers of tin-foil, like steps, presenting thus a regularly increasing thickness. This is to be submitted to photometric processes when a suitable instrument is available.

Pieces of platinum, lead, zinc and aluminium foil were so arranged as to produce the same weakening of the effect. The annexed table shows the relative thickness and density of the equivalent sheets of metal.

	Thickness.	Relative Thickness.	Density.
Platinum,	.018 mm.	1	21.5
Lead,	.050 mm.	3	11.3
Zinc,	.100 mm.	6	7.1
Aluminium,	3.500 mm.	200	2.6

From these values it is clear that in no case can we obtain the transparency of a body from the product of its density and thickness. The transparency increases much more rapidly than the product decreases.

The fluorescence of barium platino-cyanide is not the only noticeable action of the X-rays. It is to be observed that other bodies exhibit fluorescence, *e. g.* calcium sulphide, uranium glass, Iceland spar, rock-salt, etc.

Of special interest in this connection is the fact that photographic dry plates are sensitive to the X-rays. It is thus possible to exhibit the phenomena so as to exclude the danger of error. I have thus confirmed many observations originally made by eye observation with the fluorescent screen. Here the power of the X-rays to pass through wood or cardboard becomes useful. The photographic plate can be exposed to the action without removal of the shutter of the dark slide or other protecting case, so that the experiment need not be conducted in darkness. Manifestly, unexposed plates must not be left in their box near the vacuum table.

If seems now questionable whether the impression on the plate is a direct effect of the X-rays, or a secondary result induced by the fluorescence of the material of the plate. Films can receive the impression as well as ordinary dry plates.

I have not been able to show experimentally that the X-rays give rise to any calorific effects. These, however, may be assumed, for the phenomena of fluorescence show that the X-rays are capable of transformation. It is also certain that all the X-rays falling on a body do not leave it as such.

The retina of the eye is quite insensitive to these rays; the eye placed close to the apparatus sees nothing. It is clear from the experiments that this is not due to want of permeability on the part of the structures to the eye.

After my experiments on the transparency of increasing thickness of different media, I proceeded to investigate whether the X-rays could be deflected by a prism. Investigations with water and carbon bisulphide in mica prisms of 30° showed no deviation either on the photographic or the fluorescent plate. For com-

parison, light rays were allowed to fall on the prism as the apparatus was set up for the experiment. They were deviated 10 mm. and 20 mm. respectively in the case of the two prisms.

With prisms of ebonite and aluminum, I have obtained images on the photographic plate, which point to a possible deviation. It is, however, uncertain, and at most would point to a refractive index 1·05. No deviation can be observed by means of the fluorescent screen. Investigations with the heavier metals have not as yet led to any result, because of their small transparency and the consequent enfeebling of the transmitted rays.

On account of the importance of the question it is desirable to try in other ways whether the X-rays are susceptible of refraction. Finely powdered bodies allow in thick layers but little of the incident light to pass through, in consequence of refraction and reflection. In the case of the X-rays, however, such layers of powder are for equal masses of substance equally transparent with the coherent solid itself. Hence we cannot conclude any regular reflection or refraction of the X-rays. The research was conducted by the aid of finely-powdered rock-salt, fine electrolytic silver-powder, and zinc dust already many times employed in chemical work. In all these cases the result, whether by the fluorescent screen or the photographic method, indicated no difference in transparency between the powder and the coherent solid.

It is, hence, obvious that lenses cannot be looked upon as capable of concentrating the X-rays; in effect, both an ebonite and a glass lens of large size prove to be without action. The shadow photograph of a round rod is darker in the middle than at the edge; the image of a cylinder filled with a body more transparent than its walls exhibits the middle brighter than the edge.

The preceding experiments, and others which I pass over, point to the rays being incapable of regular reflection. It is, however, well to detail an observation which at first sight seemed to lead to an opposite conclusion.

I exposed a plate, protected by a black paper sheet, to the X-rays, so that the glass side lay next to the vacuum tube. The

sensitive film was partly covered with star-shaped pieces of platinum, lead, zinc, and aluminum. On the developed negative the star-shaped impression showed dark under platinum, lead, and, more markedly, under zinc; the aluminum gave no image. It seems, therefore, that these three metals can reflect the X-rays; as, however, another explanation is possible, I repeated the experiment with this only difference, that a film of thin aluminum foil was interposed between the sensitive film and the metal stars. Such an aluminium plate is opaque to ultra-violet rays, but transparent to X-rays. In the result the images appeared as before, this pointing still to the existence of reflection at metal surfaces.

If one considers this observation in connection with others, namely, on transparency of powders, and on the state of the surface not being effective in altering the passage of the X-rays through a body, it leads to the probable conclusion that regular reflection does not exist, but that bodies behave to the X-rays as turbid media to light.

Since I have obtained no evidence of refraction at the surface of different media, it seems probable that the X-rays move with the same velocity in all bodies, and in a medium which penetrates everything, and in which the molecules of bodies are embedded. The molecules obstruct the X-rays, the more effectively as the density of the body concerned is greater.

It seemed possible that the geometrical arrangement of the molecules might affect the action of a body upon the X-rays, so that, for example, Iceland spar might exhibit different phenomena according to the relation of the surface of the plate to the axis of the crystal. Euperiments with quartz and Iceland spar on this point lead to a negative result.

It is known that Lenard, in his investigations on cathode rays, has shown that they belong to the ether, and can pass through all bodies. Concerning the X-rays the same may be said.

In his latest work, Lenard has investigated the absorption coefficients of various bodies for the cathode rays, including air at atmospheric pressure, which gives 4·10, 3·40, 3·10 for 1 cm., according to the degree of exhaustion of the gas in discharge tube. To judge from the nature of the discharge, I have worked

at about the same pressure, but occasionally at greater or smaller pressures. I find, using a Weber's photometer, that the intensity of the fluorescent light varies nearly as the inverse square of the distance between screen and discharge tube. This result is obtained from three very consistent sets of observations at distances of 100 and 200 mm. Hence air absorbs the X-rays much less than the cathode rays. This result is in complete agreement with the previously described result, that the fluorescence of the screen can be still observed at two metres from the vacuum tube. In general, other bodies behave like air; they are more transparent for the X-rays than for the cathode rays.

A further distinction, and a noteworthy one, results from the action of a magnet. I have not succeeded in observing any deviation of the X-rays even in very strong magnetic fields.

The deviation of cathode rays by the magnet is one of their peculiar characteristics; it has been observed by Hertz and Lenard, that several kinds of cathode rays exist, which differ by their power of exciting phosphorescence, their susceptibility of absorption, and their deviation by the magnet; but a notable deviation has been observed in all cases which have yet been investigated, and I think such deviation affords a characteristic not to be set aside lightly.

As the result of many researches, it appears that the place of most brilliant phosphorescence of the walls of the discharge tube is the chief seat whence the X-rays originate and spread in all directions; that is, the X-rays proceed from the front where the cathode rays strike the glass. If one deviates the cathode rays within the tube by means of a magnet, it is seen that the X-rays proceed from a new point, *i.e.*, again from the end of the cathode rays.

Also for this reason the X-rays, which are not deflected by a magnet, cannot be regarded as cathode rays which have passed through the glass, for the passage cannot, according to Lenard, be the cause of the different deflection of the rays. Hence I conclude that the X-rays are not identical with the cathode rays, but are produced from the cathode rays at the glass surface of the tube.

The rays are generated not only in glass. I have obtained them in an apparatus closed by an aluminium plate two mm. thick. I purpose later to investigate the behavior of other substances.

The justification of the term "rays," applied to the phenomena, lies partly in the regular shadow pictures produced by the interposition of a more or less permeable body between the source and a photographic plate or fluorescent screen.

I have observed and photographed many such shadow pictures. Thus, I have an outline of part of a door covered with lead paint; the image was produced by placing the discharge-tube on one side of the door, and the sensitive plate on the other. I have also a shadow of the bones of the hand, of a wire wound upon a bobbin, of a set of weights in a box, of a compass card and needle completely enclosed in a metal case, of a piece of metal where the X-rays show the want of homogeneity, and of other things.

For the rectilinear propagation of the rays, I have a pin-hole photograph of the discharge apparatus covered with black paper. It is faint but unmistakeable.

I have sought for interference effects of the X-rays, but, possibly in consequence of their small intensity, without result.

Researches to investigate whether electrostatic forces act on the X-rays are begun but not yet concluded.

If one asks, What then are these X-rays? since they are not cathode rays, one might suppose, from their power of exciting fluorescence and chemical action, them to be due to ultra-violet light. In opposition to this view a weighty set of considerations presents itself. If X-rays be indeed ultra-violet light, then that light must possess the following properties:

(*a*) It is not refracted in passing from air into water, carbon bisulphide, aluminium, rock-salt, glass or zinc.

(*b*) It is incapable of regular reflection at the surface of the above bodies.

(*c*) It cannot be polarized by any ordinary polarizing media.

(*d*) The absorption by various bodies must depend chiefly on their density.

That is to say, these ultra-violet rays must behave quite differently from the visible, infra-red, and the hitherto known ultra-violet rays.

These things appear so unlikely that I have sought for another hypothesis.

A kind of relationship between the new rays and light rays appears to exist; at least the formation of shadows, fluorescence, and the production of chemical action point in this direction. Now it has been known for a long time, that besides the transverse vibrations which account for the phenomena of light, it is possible that longitudinal vibrations should exist in the ether, and, according to the view of some physicists, must exist. It is granted that their existence has not yet been made clear, and their properties are not experimentally demonstrated. Should not the new rays be ascribed to longitudinal waves in the ether?

I must confess that I have in the course of this research made myself more and more familiar with this thought, and venture to put the opinion forward, while I am quite conscious that the hypothesis advanced still requires a more solid foundation.

A curious, secretive proceeding of swans is described in *Nature* by Jessie Godwin-Austen. The cygnets having been just hatched out, the male bird picked up an empty half egg-shell lying beside the water and carefully carried to the edge of the water some twenty feet from the nest, filled it with mud, and pushed it into the river, where it sank to the bottom; and then repeated the performance with the other half egg-shell. On returning to the nest the last time, he placed a few sticks across the small track he had made. As no other pieces were seen about the nest, while five cygnets were hatched, it is inferred that the bird had done the same with all the egg-shells.

The green pocketbook is here. It is on dress parade in the hands of women of fashion. The green pocketbook came from Paris and bears the closest relation to the craze in greens which has been the notable feature in the Parisian color trend. With the passing of the spectacular effect in gloves, which are no longer broad stitched and brilliant in hue, according to the latest edicts, the green pocketbook has been able to assert itself at its full color value.

ETCHINGS.*

WHAT AN ETCHING IS.

AN etching is an impression printed from an etched metal plate—and not a pen-and-ink drawing, as is sometimes supposed.

Few people, comparatively, have ever examined one of these plates from which etchings are printed, but almost everyone has seen the engraved copperplate which prints a visiting card.

In examining such a card-plate it will be seen that the name it bears is *cut into* the copper. To print a card from this plate a thick oily ink is rubbed into these engraved lines—where it remains while the surface of the copper is wiped clean; a blank card is then laid over the plate, and both are passed through a roller press. The result is that the ink is transferred from the engraved lines in the copperplate to the cardboard; each card printed requires a separate inking and wiping of the copper-plate.

Now the principle is the same in printing an etching, and when it is once clearly understood how an etching is printed it will be easy to learn how the etched plate, which prints these impressions, is made.

HOW AN ETCHING IS MADE.

An etched plate is usually of copper (though both steel and zinc are sometimes used). The plate is coated with a sort of varnish composed of wax and other ingredients, and upon this "ground" the artist draws his design with an etching-needle. Each line so drawn displaces the coating or ground, and leaves the copper bare. The plate is then immersed in a preparation of aqua fortis, and wherever a line has been drawn the powerful acid corrodes or "bites" a corresponding line or channel into the copper, while at the same time it does not reach those parts of the plate which remain protected by the varnish. It is in this way that aqua fortis does the actual *engraving* of an etched plate; while in engraving proper the lines which form the composition are cut into the copper by means of a tool.

* Reprinted from a treatise by Frederick Keppel & Co.

When the plate has lain in the "bath" until all the lines of the design have been "bitten in" by the acid, it is taken out, and if it were then cleaned, it could be printed from in the manner already described. By remembering how the card-plate is printed from, we will readily understand that the *black parts* of the printed etching will correspond to the lines bitten into the copper, while the *white parts* will correspond to those spaces of the copper surface which have been protected from the acid by the "ground" or varnish.

But our plate is not yet finished; for if a trial proof were now printed it would be seen that all the lines of the composition were of an equal strength, and we know that in any picture the nearest objects must be drawn with the strongest lines, and that the lines must diminish in force to express comparative distances. To effect this, all the lightest lines of the etched plate are filled in, or "stopped out" with the varnish, so that when it is immersed in the bath a second time the acid no longer reaches them, while this second biting adds strength to the other lines. Further "stoppings out" with varnish and "rebitings" with the acid are necessary before the various lines of the plate have their proportionate gradations of force and tone.

WHAT A DRY-POINT IS.

Although most etchers occasionally produce plates by the dry-point process, yet the two arts are distinct, and the term "dry-point etching" is a misnomer. The word etching means corrosion (with aqua fortis), while in dry-point no acid is applied to the plate, but the lines are cut directly into the *dry* copper by means of a *point* needle. Dry-point is really a sort of freehand engraving, but the result is widely different in effect from the formal exactitude of line engraving. The rich and velvety effect of a dry-point is owing to the "burr," or rough edge of the copper which the "point" throws up as it cuts the plate; this "burr" is purposely left in certain parts of the plate because as it projects above the surface it can retain more of the ink than any other sort of line, and this rich supply of ink is transferred to the paper in printing. A dry-point will not yield nearly so many good proofs as an etched plate, but the early impressions are very soft

M. R. HEMPERLEY,
PRESIDENT PHOTOGRAPHER'S ASSOCIATION OF PENNSYLVANIA.

and beautiful. Many etched plates are afterward finished and enriched with dry-point.

HOW ETCHINGS ARE PRINTED.

There is one radical difference between the printing of etched or engraved plates on the one hand, and the printing of wood-cuts, lithographs, music, and letter-press on the other. This difference is, that in the latter case it is the *surface* which leaves its impression in ink upon the paper, while the case is reversed with engraved or etched plates, for it is the surface which prints white and the *cut-in* lines which print black. To print the pages of a book or the wood-cuts that are inserted with the type, an inked roller is rapidly passed over the surface, and this surface imprints its inked impression on the paper. This is done so rapidly, that a large edition of a book or a newspaper can be printed by machinery in a few hours—and the special value of the wood-cut is that it can be thus printed rapidly and cheaply along with the letter-press.

But when we come to the printing of an etched plate, the conditions are changed. The work which, in the case of the wood-cut or the letter-press, literally "went by steam," now requires great deliberateness and great knowledge, for the printing of etchings is an art, and the man who can print them worthily must himself have the spirit of an artist—just as the man who would perform a composition by Beethoven must himself be a musician.

For this reason, some etchers print their own plates; but very few of them possess the manual skill of a trained printer; and, hence, the more usual way is for the artist to superintend and direct the printing of the first trial proofs, and when the printer succeeds in producing one that is entirely satisfactory, this proof is given him to serve as the model which he must follow in printing the remainder of the edition.

The printing of engravings is a mechanical process, in comparison; after the lines are charged with ink, the surface of the plate is wiped quite clean, and that is all. But, with etchings, the infinite variety of effect is partly owing to the manipulation of the printer. To exemplify this, an extreme case may be men-

tioned: A French etcher—the Count Lepic—recently published a set of etchings, representing, respectively morning, noon, evening, night, sunshine, rain, fair weather, and storm—and yet all of these proofs were printed from one and the same etched plate! It was simply the variety of treatment in printing that made different pictures of them.

To see an accomplished printer about to print an etching, one would almost think that he was the artist, and that he was then making the picture.

After covering the whole plate with ink, so as to fill the lines, he wipes away the superfluous ink from the surface. In a part of the composition, where the effect should be gloomy and mysterious, he allows a thin film of the ink to remain on the surface of the plate; in another part, where the light should be vivid and brilliant, he wipes away the surface ink until the plate shines; again, where the lines should be soft and rich, instead of harsh and wiry, he draws the ink out of these lines and over their edges by means of a soft muslin rag. At this stage, the whole picture is seen in ink on the copper-plate. Now the supreme moment has come. The printer lays his plate on the platform of a roller-press, and lays the sheet of dampened paper over it; the press is slowly set in motion, and the plate, covered by the sheet of paper, passes under the heavy roller. The pressure transfers the ink from the plate to the paper, and the proof thus printed is carefully removed and set aside to dry, while the printer proceeds to print other proofs in the same manner.

But this "artistic" printing should always be controlled and dictated by the artist himself; for it is in the power of the printer to make the result a different thing altogether from what the artist had intended; and the printer should never "take the law into his hands."

Some eminent etchers insist upon having their plates wiped perfectly clean, so that no shade or tone can appear in the proof that is not already etched into the plate. This does well for minutely etched plates of small size; but a large etching, destined for framing, would certainly look meager and cold, if printed with a "clean wipe."

WHAT "PROOFS" ARE.

There is a good deal of confusion in the designation of the various proofs or "states" of a plate, and it should be remembered that there is no fixed and inalterable rule to regulate the order in which different proof-states are issued, or the number of impressions taken in each state.

A proof may be broadly defined as an impression which bears intrinsic evidence that it is one of the earliest (and consequently finest) which the plate has yielded.

We have all heard that "a new broom sweeps clean"—similarly, a new plate *prints* clean and prints well. Every impression taken wears out the plate somewhat, and therefore a worn plate can only yield inferior impressions.

The term "proof" retains its original meaning when applied to the experimental impression which a letter-press printer takes when he has set up his type, and which he submits to the writer for correction.

Two centuries ago an engraved plate was not supposed to be finished or ready for publication until after the title, the artist's name, and other lettering had been engraved on the lower margin. But it often happened that the artist—after he had finished the pictorial part of his plate, but before he had added these inscriptions—took a "proof" to satisfy himself that his work thus far was perfect. Such an impression would be without any lettering; that is a veritable "proof before letters." The connoisseurs of those days knew quite well that an early impression was best, and when they found one of these experimental proofs lacking the title, the knew it *must* be a very valuable one, and they valued it accordingly.*

The artists, seeing this, took the hint and printed several such impressions before they added the lettering to their plates—and from this beginning the whole modern system of proofs has grown.

This evolution took the following course:

* In April, 1887, at the sale of the Duke of Buccleuch's collection in London, such a proof of Rembrandt's etched portrait of Uytenbogaert brought the enormous price of $6,200.

First. A few impressions were printed without any lettering whatever; these were called the "artist's proofs."

Secondly. The names of the painter and engraver were added in small letters; this second grade was called the "proofs before letters"— that is, before the title.

Thirdly. The title was added in outline only, and the "open-letter" proofs were taken.

Fourthly. The outline letters of the title were filled in, any further lettering or inscription was added, and in this final state the bulk of the edition was issued, and these impressions were called the "lettered prints."†

During all these additions and alterations the plate was gradually wearing out from use, the early proofs were few in number and fine in quality, and in consequence they sold for much higher prices than the lettered prints.

Two other modern refinements are the "Remarque" proof and the *signed* artist's proofs. The French term *une epreuve de remarque* is simple and intelligible, and any Frenchman will know that it means a proof bearing a special mark; but in England the term becomes unmeaning, for the reason that our word "remark" is not a translation of the French term—and it is much to be desired that some more intelligible English word could be substituted.

The "remarque" proof, like proofs in general, had a sort of accidental origin. While a plate was in progress the artist sometimes amused himself—or tried the condition of his etching-needle—by scrawling some little sketch on the blank margin of the plate. It was easy to burnish out this sketch before the formal printing of the plate had begun, but occasionally an early proof was taken beforehand. This was a veritable "remarque" proof, and the informal sketching in the margin was evidence of its earliness.

† It should be explained that, in tracing the origin of proofs in general, a digression had been made from the subject of Etchings to that of Engravings. The old system of "open-letter proofs," etc., no longer obtains in the case of modern etchings; and, in act, many etched plates *have* no blank margin upon which a title could be engraved. Information as to the relative grades of such etchings will be found under the heading, "What the 'States' of an Etching are."

In the case of some line engravings, the remarque is indicated—not by adding a sketch, but by leaving some trifling detail of the composition unfinished.

According to modern usage, the "remarque" proof indicates the very choicest condition of the plate and takes precedence of the artist's proof; so that the best possible state of a contemporary etching would be a "remarque" proof, printed probably on vellum and signed by the etcher (or by both painter and etcher, if the plate were etched from a picture by another contemporary artist). After a limited number of such proofs are printed, the "remarque" is effaced from the copper-plate, and then the artist's proofs are taken.

Some distinguished etchers are intolerent of the "remarque," and insist that it is an interruption to the unity of the main composition. In the etched work of Seymour Haden, for instance, no such thing is to be found.

But a more valuable evidence of high quality than the "remarque" is the autograph of the artist written on the lower margin of an etching. The etcher, above all others, should be the judge *par excellence* of quality, and no conscientious artist will affix his signature to a proof unless that proof is all that it should be. The artist's signature may thus be compared to the endorsement by a solvent man of a promissory note. Occasionally, when an etching is done from a painting by another artist, both the painter and the etcher will formally guarantee the quality of a few selected proofs, by adding their respective signatures.

A Clever Child.—Showman at a Fair: Ladies and gentlemen, I 'ave the 'onor to introduce to your kind attention this baby, six months old. Otto can read anything you put before him. Will some one kindly 'and up to Mr. Otto a newspaper? Some one does so, and Otto holds the paper in his tiny hands but never says a word. A voice from the back: 'E can't read! Showman: Yes, sir, he can, but you don't expect an heddicated baby to spell out every word, do you?—[Curtain.]

REMARKS UPON THE PHOTO-SCIOGRAPH.*

SO far as the photographic properties of the new X rays of Roentgen are concerned, it is yet a question whether they will ever be of any practical value or use for photographic purposes, as the term is usually understood.

The fact that these rays can neither be refracted, condensed or dispersed, is a fatal objection to their application to photography.

It will be noticed that all of the registered or permanent results obtained and shown here this evening, are by no means photographs in the ordinary sense of the word; they are merely fixed shadows or "sciographs," obtained by the interposition of a sensitive gelatine plate.

I do not wish to be understood as depreciating this new factor in physics, nor to appear skeptical as to any practical results that may be forthcoming in the future. It is now certain that a great discovery has been made by Professor Roentgen, notwithstanding the fact that these identical rays have been produced thousands of times in nearly every physical laboratory in the world, and that it only needed the neighborhood of a luminous coating to film to reveal them, and to do this was Professor Roentgen's opportunity. The step to substitute a sensitive plate to register the shadow was a short one, and we have here to-night a practical demonstration of the results.

I now wish to call your attention to another peculiarity of the new Roentgen rays that has just come to my notice, and had time permitted, I should have had the specimens here to illustrate my remarks.

The most exhaustive series of photographic experiments thus far made in connection with the Roentgen rays are the investigations at the Imperial Experimental Institution at Vienna†

Thus far no results have been obtained greater than the original skeleton of Prof. Roentgen. Scientifically, however, the curious fact has been learned that the actinic action of the so-

*Read by Julius F. Sachse, before the American Philosophical Society, February 21st, 1896.

†k. und k. und Veruchsanstalt fur Photographie.

called rays is dependent to a great extent upon the medium or support that holds the haloid salts in suspension.

It appears that for some reason as yet unknown the new Roentgen rays have a peculiar affinity for a sensitive plate whose support consists of animal matter or gelatine. Now if we take a plate of equal sensitiveness, but substitute collodion for gelatine, and expose it to the X rays, no effect whatever is produced. The rays seem to be absolutely inert the moment any medium is substituted for the animal support of the ordinary commercial dry-plate.

This series of experiments at Vienna consisted in testing the ordinary bromo-argentic gelatine dry-plates of different degrees of sensitiveness together with argentic-iodide collodion (wet) plates, bromide (Albert emulsion) and argentic chloro-bromide collodion plates, the latter developed with an alkaline solution.

The result of this series of experiments was that the Roentgen rays made little or no impression upon any variety of the collodion plates, whether wet or dry, while upon the contrary every variety of gelatine plate, no matter whether sensitized with argentic bromide, iodide or chloride, proved a ready recorder for the Roentgen rays. The most effective plates were what are known in Germany as the "Schleusner Rapid" bromo-gelatine dry-plate; they are equal in rapidity to our American plates "Sensomiter 23." *

It appears from this series of experiments that the most marked difference was found in the comparison of a chloro-bromo-gelatine dry-plate with a collodion wet-plate, both of which were carefully tested as to their equal sensitiveness by daylight prior to being exposed to the X rays. Where the dry-plate with alkaline development proved a success, the wet-plate with an acid-iron development was an absolute failure.

Another peculiarity shown was that an alkaline development in every case gave better results than a neutral or acid one. Then again when a dry-plate of the kind giving the best results was

* This fact was verified by subsequent experiments by Prof. Goodspeed at the University of Pennsylvania.

moistened or dampened before exposure, the sensitiveness for the X rays was greatly diminished.

Here perhaps we may find a solution to the problem why it is that none of the American results obtained by use of the X rays thus far have been equal either in distinctness of outline or reproduction of detail to the German sciógraphs. It may be to the humidity of our atmosphere, more than to the quality and character of our photographic dry-plates, or the lack of skill of our experiments, that we have to look for either cause or failure.

It will thus be seen that many new factors enter into the photographic development of the new forces. Conditions seem to arise at every turn that are entirely foreign to those encountered when we work with either solar or artificial light, and this independent from the optical features which I have mentioned.

Now the question naturally presents itself as to the kind of sensitive plate or medium which should be used to obtain the maximum results of the actinic action of the X rays, or in other words by what means can we obtain the best permanent photo-sciograph. As to the difference between the action of the X rays upon gelatine and collodion I would venture the theory that if these results are confirmed by experiments here, it is due to the fact that while gelatine arrests the X rays, they pass through or penetrate the collodion film. If this should prove to be the case, it would indicate the use of double-coated plates, or of a stripping film upon a support impervious to the X rays, such as a sheet of lead. By such means perhaps photographic results of still greater value might be obtained. I will here state incidentally that the Schleusner plate used in the German experiments is coated somewhat heavier than the average American plate.

I now come to another aspect of the possible development of the photographic properties of the new forces, an experiment thus far untried in connection with the Roentgen rays. For this purpose I will turn backward and take recourse to the original principles of heliography, and suggest a series of experiments wherein we substitute for the gelatine dry-plate a highly polished sheet of metal, subjecting it to the action of the X rays in the usual manner, and then seeking to develop the impinged image,

if there be one, with the fumes or vapor of mercury or iodine or the two in combination, a process well known to photo-experts of the old school.

Tests should also be made upon the silvered copper plate coated with the vapor of iodine and developed with the fumes of mercury (the old Daguerreotype process). Or upon plain sheets of polished copper, silver or tin, and developed either with vapor or by the application of heat to the reverse side of the plate; a process known as "Hunt's thermography."

The above experiments are well worthy of a trial in connection with the development of what may be called "photo-sciography."

In conclusion, I will call your attention to a curious coincidence. It was in this room, just 53 years ago, during the centennial celebration of this society (May 29th, 1843) that an almost identical topic formed the theme for discussion, viz: "Moser's Theory of Invisible Photographic Rays," a theory which was then attracting great attention in scientific circles on both sides of the Atlantic. Remarks upon the subject were made by a number of members present, among whom may be named Dr. Paul Beck Goddard, Joseph Saxton, Prof. Henry and Prof. James Rodgers, all names that are still held in high esteem in the scientific world.

While upon the subject of Moser's theory, I will state that there has of late come to my notice several cases which seem to confirm his theory of latent light, or invisible photographic rays. The most marked instance was where a number of platinum prints were packed away and laid undisturbed in the dark for several months, and in several cases had reproduced themselves or formed a positive picture upon the surface of the white plate paper mount which laid immediately over the print. I merely mention this matter at this time so as to place it upon record, as I expect to bring it before the Society in a more formal way in the near future.

As a fitting close to this paper I will quote the language of Robert Hunt, used in connection with Moser's theory, and read here half a century ago, as it will apply with equal force to the theory of unknown waves known as the X rays of Roentgen;

"As a subject of pure scientific interest this discovery promises to develop some of those secret influences which operate in the mysterious arrangements of the atomic constituents of matter, to show us the road into the hidden recesses of nature's works, and enable us to pierce the mists which at present envelop some of its most striking phenomena. It has placed us at the entrance of a great river flowing into a mighty sea, which mirrors in its glowing waters some of the most brilliant stars which beam through the atmosphere of truth."

Landmarks.—But there are other landmarks than old trees. True; there are old houses, and we add, perhaps, old men. The village without its patriarch is incomplete; and what a difference between Colonial houses and those that have recently sprung into existence! We breathe in the odor of unpainted cedar and mossy shingles, and strive to rid our lungs of the smell of paint. We seldom stop to look at a house built in our own lifetime; but how generally we scrutinize the old house near by, though we may have seen it daily for many years! Its quaint porch, the small-paned windows, the low eaves and substantial chimney, appeal to us, and we wonder if life is not more restful and soul-satisfying under such a roof. The old man in his high-backed rocker, dozing by the fireplace, the old woman knitting in her throne-like easy-chair, the willow-pattern china in the open cupboard,—what a picture! But these venerable people cannot long remain, and then what? The children scatter the furniture, the old house is torn down, and we have the smell of paint and the chatter of strangers. Can we not at least preserve one such house in every village, furniture and old-fashioned garden and all else, keeping it for our children's sake, an illustration on the page of local history? What a poor exchange for this is a single chair or an odd plate upon the mantel of a new house! Detached from their proper surroundings, few objects retain their real beauty. It is like the caged canary as a substitute for the free minstrel of the wildwood.—*Charles C. Abbott, in Lippincott's.*

In Extremis.—Wealthy Father: I am sorry to tell you, sir, that I cannot allow my daughter to marry you, as you have not sufficient means to keep her. Poor, Lovesick Clerk: Thank you, sir. Might I ask if you have a vacant post in your office?

THE TURKEYTOWN HYPO CLUB.

"A ROENTGEN NIGHT."

GREAT was the excitement among the elite of Turkeytown when the leading weekly announced in heavy-faced display type and double-leaded head-lines the fact that the Turkeytown Hypo Club had decided to give at their next stated meeting a practical demonstration of the new photography with Roentgen X-rays, and that a certain number of invitations would be sent to citizens of Turkeytown, prominent for their wealth and social position.

The announcement further stated that an exhibition or wall display would be made on the same evening showing all of the results and progress made thus far by aid of Roentgen's X-rays. In addition a number of interior photographs would be taken by the members on that evening. Further, that if any persons of social prominence in Turkeytown had reason to suspect any unlocated bullets in their bones they would be cheerfully located and photographed during the evening.

The practical demonstration would be under the direction of Prof. Benjamin Franklin Sparckatcher, Ph.D., A.M., C. G., Medical magno-electro manipulator of the Pidgeonville Ladies' Seminary, who would operate the current furnished by the local electric light company.

Upon the eventful night the hall of the Hypo Club was packed long before the appointed hour with the members and such Turkeytowners as were fortunate enough to receive an invitation.

Upon the wall space of the room were arranged a number of specimens of the wonderful new photography, which had been cut out of the daily city papers, mounted and framed.

The proceedings of the evening were opened by Prof. Gobler, resplendent in a full dress suit and a white carnation, who stated that on account of the impossibility of obtaining in this country a Crookes tube the practical demonstration of the evening would have to be disposed with for the time being, but the process would be thoroughly explained by Professor Sparckatcher, after which an exhaustive discussion by the members would be in order;

and that he now had the pleasure of introducing Professor Benjamin Franklin Sparckatcher.

The Pidgeonville scientist then read an exposition of the new energic force, copied from the *Scientific American* and other papers which gave any account of the now much-talked-of discovery.

When this was finished Prof. Gobler arose and stated that what had thus far been published was all very well, but it failed to give any information as to what caused these wonderful rays or where they came from. To furnish this information and thereby add to the world's knowledge was now his privilege.

"It has been stated," continued Professor Gobler, "that these same rays have been produced by many professors in all laboratories for years past without being discovered. Now this statement is all wrong, and should not be accepted as a truth. There is no doubt whatever that Professor *Runtgen* is the actual discoverer of the new rays, and that they never existed upon this earth before a very recent period. In fact they are an entirely new kind of rays, that do not belong to the atmosphere of this planet at all.

"Now," continued Professor Gobler, "it is well known to us scientists that for the last six or eight months Perrine's comet has been rapidly approaching the earth, at a speed of a million miles an hour, and making a complete revolution once every second, whisking the earth with its tail of gaseous matter, which, being spectroscopically examined, proves to be of the rainbow order, crossed by bright lines indicative of incandescent carbon and nitrogen; and here," said Professor Gobler, "is to be found the secret of the new rays and whence they come."

As the learned professor turned to his hearers the room fairly shook with applause.

Mr. Ryttenhouse Shutter here stated that although it was true that *Rondgean* had discovered the X-rays, it was also a fact that to Professor Gobler, of the Turkeytown Hypo Club, belongs the credit of now first giving a plausible explanation of their possible nature; and he perfectly agreed with him that the new rays were of a cometary origin.

Mr. Heliogabalus Wyk asked whether he was correct in un-

derstanding Professor Sparckatcher to say that the rays were due to a fluorescence of the cathodic rays at the base of the Crookes tube. If this be so, he would claim the priority of the discovery, as in his experiments with aniline dyes he had frequently noticed that they fluoresced when they dried, and there was no doubt that if he had placed a plate and holder in the proper position, he would have obtained results equal to those of Professor *Rungin*. Now in his opinion the action of the new rays as excited by the comet was due entirely to the fluorescence within the tube, and he was now experimenting with a combination of dyes on the lines mentioned before the club several months ago, and he expected soon to effect a combination of the three primary colors in such a manner that a Crookes tube could be so coated with the solution as to regulate and control the nature of the fluorescence, which would produce not only regular photographs, but also give us an insight into the human body, and impress the view in natural colors.

Dr. Oxalate Strong said that while he was in perfect accord with what had been stated by the speakers he regretted that these facts had been brought out in public. Matters of such deep scientific import should by no means be published broadcast, much less be given to the daily papers or photographic periodicals, as the next thing would be that Herr Vogel, *Mounseer* du Haron or some other foreigner would step up and claim the priority; and although we have to accord Professor *Roondgin*, and unfortunately a German at that, the credit of the discovery, yet he never was able to either explain the rays or control them.

We have heard here to-night *Roondgin's* own account, from Professor Sparckatcher, as well as the solution of the whole problem from our own scientists, Messrs. Gobler and Wyk. He would impress it, however, on all present that what has been disclosed was confidential and not for publication,—with particular reference to photographic periodicals.

After the usual complimentary vote of thanks to all concerned the meeting adjourned, and one of Turkeytown's greatest scientific events was a thing of the past.

J. Focus Snappschotte.

MINUTES OF THE EXECUTIVE COMMITTEE OF THE PHOTOGRAPHERS' ASSOCIATION OF AMERICA.

HOTEL HUMPHREY,

JAMESTOWN, N. Y., January 20th, 21st, and 22d.

THE meeting was called to order by President Bellsmith. Treasurer Hayes and Secretary Kellmer present. The minutes of the eleventh annual convention held in Detroit, Mich., read and adopted. The resignation of second Vice-President W. J. Root was received and read, and on motion accepted.

President Bellsmith appointed Mr. George T. Bassetto, of Indianapolis, to fill the office of second vice-president, which appointment was confirmed by the Board. Motion by Mr. Bassett, and seconded by Mr. Hayes, to empower secretary to collect outstanding bills for floor space at Detroit Convention, amounting to $290.00. Carried.

Moved by Mr. Hayes, and seconded by Mr. Bassett, to print 2,000 copies of constitution and by-laws in pamphlet form, with the addition of changes in constitution made at Detroit Convention, with a list of officers and members, and to collect advertising matter from manufacturers and dealers to defray the cost of printing same, and that a copy of each be mailed to every member of the Association. Carried.

Moved by Mr. Bassett and seconded by Mr. Kellmer, that Mr. Hayes, treasurer, shall settle bill of the Biglow Flash-Light Machine in the most satisfactory manner possible, and report same to secretary.

Adjourned.

JANUARY 21ST, 1896.

Meeting called to order, President Bellsmith in the chair. Moved by Mr. Bassett, and seconded by Mr. Hayes, that the 12th annual convention of the P. A. of A. be held in the auditorium at Celeron, Chautauqua Lake, the week beginning June 22d to 27th, inclusive. Carried.

The reason for holding convention at this early date was decided upon by the committee on the assurance of Mr. Broadhead, the President of the Celeron Amusement Company, that this time of the year is the most pleasant, and that there will be better accommodation for visitors than later in the summer.

Resolved, that the territory covered by the P. A. of A. be divided in four sections, for the purpose of encouraging competition.

The divisions are to be known as the Eastern, Western, Middle, and Southern. Each division will have a separate set of prizes in all

classes, and the winning exhibits of the first prize in genre and A classes in each of these respective divisions will be at once entered to compete for the grand portrait and grand genre prize.

EASTERN DIVISION.

Maine, New Hampshire, Vermont, Massachusetts, Connecticut, Rhode Island, New York, Pennsylvania, Maryland, New Jersey, Dominion of Canada, and District of Columbia.

WESTERN DIVISION.

Washington, Oregon, Minnesota, California, Idaho, Utah, Arizona, Montana, Wyoming, Colorado, New Mexico, Nebraska, Kansas, Missouri, Indian Territory, Texas, North and South Dakota, Nevada, Oklahoma.

SOUTHERN DIVISION.

Arkansas, Louisiana, Mississippi, Alabama, West Virginia, Delaware, Tennessee, Kentucky, North Carolina, South Carolina, Florida, Georgia, and Virginia.

MIDDLE DIVISION.

Wisconsin, Iowa, Michigan, Illinois, Indiana, and Ohio.

Members of the P. A. of A. in each division to compete separately in the following classes: The first prize winners of genre class in each division to compete for a grand prize to consist of a bronze figure piece; the first prize winners of each division in Class A to compete for one grand prize to consist of a silver loving cup.

The exhibits winning the grand prize in the genre and Class A to become the property of the Association, for the purpose of forming a permanent exhibit.

Special attention is called to the fact that one-third of the possible points are marked in the genre class for originality.

This plan affords the possibility of a member's work meeting with a just award by virtue of competion with the fellow fraternity of his own section of the country, without interference to the work made by members in foreign territory with whom they do not compete or meet in their regular business relations.

In addition to this it encourages all sections of the country to competition and progress, inasmuch as the grand portrait and grand genre prizes are awarded by a competent selection of the best work culled from only the first prize winners of the various divisions of territory, and gives each section equal chance in winning the two grand prizes.

LIST OF PRIZES.

Genre Class.—Three pictures, 13 inches or larger, on any matt surface paper, subject to be chosen by the photographer, the title to be appropriately inscribed on each picture, to be framed at the discretion of the exhibitor, with or without glass—one gold medal.

Class A.—Twenty-four pictures, six pictures to be 16 inches or larger—one gold medal, one silver medal, one bronze medal, and one diploma.

Class B.—Six pictures, 13 inches or larger—one gold medal, one silver medal, one bronze medal, and one diploma.

Class C.—Twenty-four pictures, 10 inches or smaller—one silver medal, one bronze medal, and one diploma.

Class D.—A rating competition, twelve cabinets only—first prize, one silver medal, and to all receiving 21 points or over a bronze medal.

Class E.—Landscape with or without figures; marine views or interior, 13 inches or larger; six pictures—one silver medal, one bronze medal, and one diploma.

Class F.—Landscape with or without figures; marine views or interior, 10 inches or smaller; twelve pictures—one silver medal, one bronze medal, and one diploma.

Class G.—Combination pictures, three combination prints, size to be left to discretion of the photographers—one silver medal, one bronze medal, and one diploma.

Class H.—Commercial pictures, twelve pictures—one silver medal, one bronze medal, and one diploma.

Class I.—Most tastefully-arranged exhibit—one diploma.

Class J.—Foreign exhibit; best collection of photographs, any size, framed or unframed, to be delivered to the Association free of charge—one gold medal, one silver medal, one bronze medal, and one diploma.

RULES AND REGULATIONS.

1. All competitors must be members of the Association.

2. Exhibitors cannot compete in more than one of the following classes—A, B, C, or D. All photographs for Association prizes must be made from negatives taken since the last convention.

3. One dimension given applies to either length or breadth of pictures in all classes. This rule applies to the size of the print, and not the mount.

4. Should any exhibitor use his or their influence in any way, directly or indirectly, with judges during their term of office in favor of any exhibit, it shall be the duty of the judges to strike their exhibit

or exhibits from the list. All exhibits must be framed, with or without glass. The committee suggest a one-inch oak frame.

5. Ten marks to be the highest given for any one point; consequently thirty points is the highest that can be given to any one picture.

6. All exhibits must be shipped to Jamestown, N. Y., in care of P. A. of A., by June 17th, and all charges prepaid.

7. Entries for art department to close positively June 10th. No space will be allotted after that day. Application for space in this department must be made to George T. Bassett, second Vice-President of the P. A. of A., 40 N. Illinois Street, Indianapolis, Ind.

8. All art exhibits must be sent to George Steckel, first Vice-President of the P. A. of A., to Jamestown, N. Y., and all charges prepaid.

9. Exhibits from stock department to be shipped to J. William Kellmer, Secretary of the P. A. of A., charges prepaid, to Jamestown, N. Y., and placed in position by 10 a.m., June 22d.

10. Have your box covers screwed instead of nailed; put your home address on underside of cover for return of pictures; put screw-eyes and picture wire in the box, and ship your exhibits early.

11. All boxes and packages will be accepted at any time previous to the convention, so that photographers need not feel any uncertainty about the safety of their goods. No exhibits will be allowed to be removed from the hall until the close of the convention.

12. All these rules and regulations will be strictly adhered to.

APPOINTMENT OF JUDGES.

1. Three judges to be appointed for each division by the Executive Committee, and their identity to remain unknown until after the awards are made.

2. Three judges to be appointed for the grand genre, the grand portrait, the foreign, and most tastefully-arranged exhibit, by the Executive Committee.

JANUARY 22D, 1896.

Meeting called to order, President Bellsmith in the chair. Report of the Secretary for 1895 read. On motion of Mr. Bassett, and seconded by Mr. Hayes, to accept same, carried.

Report of Treasurer for 1895 read, and account audited by President Bellsmith and the Secretary. On motion of Mr. Bassett, and seconded by Mr. Hayes, adopted as read.

A proposition was received from Mr. Broadhead, President of the Celeron Amusement Company, offering to rent the auditorium, includ-

ing band and all privileges, for $300. On motion of Mr. Bassett, and seconded by Mr. Hayes, proposition was accepted, and the Secretary was instructed to inform Mr. Broadhead by letter to accept the same. Carried.

Committees.—President Bellsmith and Mr. Hayes, committee on railroads; President Bellsmith and George Bassett, committee on medals and grand prizes.

The bond of Mr. Hayes, Treasurer for 1896, was accepted, his bondsmen being Mr. George H. Russell, of Detroit, Mich., President of the State Savings Bank, and Mr. George R. Angell, of Detroit, Mich., Cashier of the City Savings Bank.

Adjourned sine die.

Carbon Printing Without Transfer.—Mr. Valentine Blanchard has just described to the Royal Photographic Society a process of this kind, in which ordinary carbon tissue is rendered translucent by immersion in petroleum oil. When the excess of oil is wiped away, printing from the negative is done through the paper, and development is performed from the front in the ordinary manner, or, locally, with a brush. The immersion in the oil should be done rapidly, or markings may result. Where reversal as regards right and left is to be avoided, Mr. Blanchard recommeuds the use of oiled paper negatives made on albumenized paper, from an intermediate glass transparency, as in the effective method of enlarging practiced by himself more than twenty years ago. The method is not new, but is of some interest at the present time, when so many photographers are taking to carbon printing in one form or another for its artistic qualities. There can be no doubt that many workers would now find an interest in trying several of the old printing processes which were discarded years ago on account of loss of detail, or presence of grain in printing. A carbon image on a fine transparent support, which could be mounted upon any kind of surface desired, might give some effective results. In many pictures the true right and left of the subject is of little importance, as is also, from a pictorial point of view, the presence of a slight grain or breaking up of the image, caused by printing through a paper support. The Artigue process is another method of carbon printing without transfer, which is likely to be considerably used for its fine qualities and adaptability in the hands of picture workers.

The Editorial Dropshutter.

Plagiarism.—The AMERICAN JOURNAL OF PHOTOGRAPHY is devoted to the interests of photography in its widest sense, and is published in the interests of the practical photographer, professional and amateur; and we are always pleased to be quoted at home and abroad. Our object is to have as extensive a diffusion of practical photographic knowledge as possible. For this reason we seldom copyright any of our contributions or even complain when any of our papers is republished without credit. So high, however, is the plane of photographic journalism at home and abroad that any instance of the latter kind is a rare exception. Unfortunately this sense of honor is not always to be found in the average member of amateur photographic societies, a prominent instance within our experience being where the learned speaker of the evening read almost verbatim one of Professor Mendola's lectures as his own. Now a somewhat similar instance is noted in the proceedings of The Society of Amateur Photographers of New York, where the Chairman of the Committee on Progress in Science and Art, at the regular November meeting of the Society deliberately presents one of our papers on the "Improvement of Negatives," and passes it off as an original contribution of his own,—not only an injustice to his Society, which has published the article as an original paper by their learned scientific chairman, but an injustice to the AMERICAN JOURNAL OF PHOTOGRAPHY, which had translated and amplified the paper in question for the issue of July, 1895. Nor can the excuse he offered that recourse was taken by the speaker to the original German of Von Norath, as the amplifications and ear-marks of the American translation appear in the learned scientist's paper.

Photographs in Natural Colors.—During the lull in the excitement relative to the new interior photography by the X-rays, when for two or three days no new wonders cropped out to astound the multitude and furnish food for the sensational press, the old, thread worn stock tales of color photography were at once brought out to fill the gap. These oft repeated tales are only for the unsophisticated, and the question is why do reputable papers persist in giving them publicity. The problem of color photography has not been solved, all statements to the contrary notwithstanding. If ever it should be, specimens would at once be placed on exhibition, and every leading gallery in the land would attain the right to use the process.

Stereo-chromoscope.—A new and perfected optical apparatus to show photographic positives in the natural colors and in relief has been constructed by Niewenglowski according to ***La Photographie***, and patented by him. This apparatus is an improvement upon both Zink and Vidal's methods, in so far that it permits an increase or decrease in the various color sensations at will. This desideratum is obtained by the use of a Nicol prism in such a manner that it acts both as a polarizer and reflector.

Travelers from Alaska.—Professor Benjamin Sharp, of the Academy of Natural Sciences, who recently returned from a trip to Alaska and Siberia, related the details and results of his travels recently to the members of the Academy. He covered the story of his trip substantially as he told it to the *Ledger* the day after his return. As his pelts, weapons and other specimens are still on the United States patrol boat Bear, and will not reach Philadelphia for some months to come, he was not able to speak very particularly of the strictly scientific side of the work. Mr. John M. Justice, of the Geographical Club, who accompanied him and took photographs at all the points of their journey, was present, and cast the lantern slides upon the screen while the Professor talked about them. There were numerous photographs of the United States Reindeer Station at Port Clarence, Alaska, and of the reindeer being brought to the American side from the wilds of Lapland, on the North Siberian coast. The Government is introducing the reindeer in Alaska for the use of the Esquimaux. There were also several slides taken while the Bear was caught in an ice pack while trying to reach Point Barrow, where there is a refuge station for shipwrecked whalers. A photograph taken at sunset on the American side of the strait showed the heights on the Siberian side lying black above the ocean, forty miles away. A number of photographs of real rockeries on St. George's Island had been taken, but they are now at the Smithsonian Institute in Washington. Three or four years ago 100,000 seals were killed in a year, but last year the sealers "only killed 15,000." Professor W. Townsend, the naturalist stationed on the Albatross, has photographed the rockeries year after year from the same points, and the appalling slaughter of the animals is shown at once by comparison. Very often when the travelers went ashore the weather was warm and almost balmy, and many of the scenes in Alaska were as green and summer-like as any that could be found near Philadelphia.

Minneapolis Camera Club.—Burt's art gallery was fully taxed on the evening of Wednesday, January 29th, with an appreciative audience, it being the first public entertainment given by the Minneapolis Camera Club this year. "Lantern Photographs" from the Omaha Camera Club, St. Louis Camera Club, and the Frankford Camera Club, as well as about seventy by the local club, were exhibited and proved very instructive, especially those illustrating life among the natives of northern Siberia and Alaska.

Photo-sciographs.—Mr. George Smith, proprietor of the well-known Fountain Square Studio, in Cincinnatti, claims to be the first professional photographer to use the Roentgen discovery in connection with his regular business. Mr. Smith advertises to take sciographs of the hand and other objects. He has succeeded in obtaining some results which will be exhibited at the next convention.

A Combined Photo-chromoscope and Color Camera.—B. J. Edwards publishes in the *British Journal of Photography* the drawings of an instrument that can be utilized either as a photo-chromoscope or a camera for making triplicate exposures with a single lens combined by the use of three color screens, red, green and blue violet. By substituting a pair of matched lenses the apparatus becomes stereoscopic. This apparatus appears to be nothing more than a variation of the simple step photo-chromoscope of Carl Zink. It has been patented, we believe, in England.

American Draughtsmen.—A large and enthusiastic meeting was held on the evening of February 29 ult. at the new Odd Fellows' Temple, Philadelphia, for the purpose of forming a local chapter of American Draughtsmen. An association was perfected and the following gentlemen were elected as officers: President, J. W. Sinn; Vice-presidents, Archer Richards and H. M. Alexander; Secretary, E. E. McClymont; Financial Secretary, R. P. Hideborn; Treasurer, W. Boyd.

Fine Photographs.—Some very fine results are shown on John R. Clemons' plain American salted paper, the range of tones running from warm brown to a rich velvety black.

Quite recently the question arose in the courts at Brussels, in the course of a dispute as to some artistic property, as to whether photography was to be considered an art. Subsequently the matter came before the Appeal Court at Aix, and was decided in the affirmative.

John Traill Taylor Memorial.—In accordance with a generally expressed feeling among photographers, that means should be taken to perpetuate the memory of the late Mr. J. Traill Taylor, and to record the services which he rendered to photography and to photographers during a long and industrious career, a well-attended meeting was held in London, on December 20th last, at which Sir Henry Truman Wood, M.A., President of the Royal Photographic Society, took the chair, and it was resolved that subscriptions should be invited from those interested in photography to found such a memorial. A special committee was appointed from amongst the general committee to consider and to report upon the most advantageous method of carrying the idea into effect, and authorized to open a subscription list for the purpose of raising the funds.

Photographic Association.—Sixty teachers have already sent in their names for membership in the prospective "Teachers' Photographic Association of Philadelphia," and the organization will soon be completed. Superintendent Brooks has sent out notices regarding the formation of the society, which will no doubt exercise a fine influence in the schools. In it he states that the purpose of the association will be the mutual improvement of its members in the art of photography, and in all that relates to pictorial illustrations in connection with school work. It is proposed to make the dues very moderate, probably not more than one dollar per annum. Teachers who desire to connect themselves with the association are invited to send their names to C. Henry Kain, chairman of the committee, and notices will be sent them in regard to the time and place of meeting for organization. Further information may be obtained upon application to any of the committee—C. Henry Kain, William S. Jacobs, George W. Flounders, Mary R. Caroland, Matilda Hand.

Explosion in a Studio.—At 6 o'clock on the morning of February 1st, Albert Davis, the colored janitor of the photograph gallery of C. M. Gilbert, on the second floor of 926 Chestnut Street, went up the stairs of the building, lit the gas, and unlocking the main door, made preparation for getting the place in readiness for visitors. In the rear of the reception room is a smaller one lighted by half a dozen gas gets used for the display of frames and separated by a wood partition. Davis a moment after entering the reception room threw open the door leading into the one in the rear, and an instant later there was an explosion and he was hurled back into the front room. There he lay for a moment on the floor stunned, burned and badly scared,

while he saw the flames rising in the back room, part of the ceiling of which had fallen in. Then he got up, ran down stairs and out into the street, where he found a policeman, who turned in an alarm. Chemical engine 19 responded first, and the flames were quickly put out. The damage by fire is, therefore, very slight, but that caused by explosion is heavy, although Manager A. M. MacIntire said that he could not say just what it amounts to until Mr. Gilbert returns from New York. The stock in the back room was partially ruined by the falling plaster, and the front room was also damaged. The many negatives which are in the front of the establishment were not injured, however. The skylight of the operating room, back of the one in which the explosion occurred, was smashed and the room damaged. Janitor Davis, who refused to leave the scene of the explosion until the fire was out, was taken to the Jefferson Hospital. He said that when he entered the front room he did not notice the smell of gas, which must have come from one of the jets in the rear room. He had been sick on Friday, and his place was taken by his friend, Andrew Burchard, who was the last to leave the rooms that evening.

A substitute for whitewash called "asbestos cold-water paint" has recently been invented. It is claimed that this paint will neither scale, rub, nor drop off, and that one coat properly mixed and applied will cover as well as two coats of whitewash. It is a fire retardent to a considerable degree, and through being treated with carbolic acid it is also a disinfectant. "An electrical eneineer expresses the opinion that whereas an insulated electric-light wire carried over a dressed, seasoned pine surface painted with oil paint might ignite at a point where there was an imperfect insulation, such a result would be prevented where this asbestos paint is used."

See that each hour's feelings and thoughts and actions are pure and true; then will your life be such. The wide pasture is but separate spears of grass; the sheeted bloom of the prairie but isolated flowers.

Do daily and hourly your duty. Do it patiently and thoroughly. Do it as it presents itself. Do it at the moment, and let it be its own reward. Never mind whether it is known and acknowledged or not, but do not fail to do it.—*Spiritual Gems.*

A noble life is not necessarily made up of great efforts, but of little acts of duty well-performed, well-timed words of encouragement and appreciation, deeds of kindness and charity, gentle forbearance, warm hand-clasps of sympathy, smiles of cheer.

THE PHOTOGRAPHERS' ASSOCIATION OF PENNSYLVANIA.

CONSTITUTION.

Article I.

This Association shall be called the Photographers' Association of Pennsylvania. Its aim shall be to unite the photographers of Pennsylvania in the following objects:

1st. The prime object of this Association shall be to foster a feeling of social intercourse among its members; to establish fraternal relations and good fellowship, by bringing together in convention all related to our art, thus stimulating and creating an interest among ourselves and the public as well.

2d. To improve the science and art of photography by diffusing scientific and practical knowledge among its members, fostering photographic literature, stimulating discovery and invention, and encouraging the production and manufacturing of all articles required for photographic use.

3d. To discourage anything which has a tendency to stint or hamper the art's progress.

4th. To establish the relations between members of the profession and their patrons upon just, pleasant, and business principles, which shall promote the public welfare and be of mutual advantage to the photographer and patron.

5th. To inaugurate exhibitions of photographic productions on a scale commensurate with the progress of the art.

Article II.

SECTION 1. Any photographer, either professional, employe, student, or retired, any portrait artist, any manufacturer, or dealer in photographic stock or artists' materials, dry plate manufacturer or his representative; any or all of the foregoing in Pennsylvania shall be eligible to membership, if they comply with the By-Laws of this Association, and can fulfill the requirements thereof.

Article III.—Terms of Membership.

SECTION 1. Any resident of the state who is eligible may become a member of this Association by making application to the Treasurer, signing a copy of the Constitution and By-Laws, and paying an initiation fee of two dollars and one year's dues of one dollar, in advance.

SEC. 2. Any non-resident of this state who is eligible to honorary

membership, may become such by remitting initiation fee to the amount of two dollars in advance to the Secretary of this Association. They shall not be eligible to officiate or vote at any of our meetings.

SEC. 3. Employes will pay into the treasury their annual dues the sum of one dollar. No initiation shall be required.

SEC. 4. Annual dues become payable January 1st, and must be paid prior to adjournment of first annual meeting; any member failing to do this shall forfeit his membership and right of franchise, and can only be reinstated upon the payment of all arrearages in dues.

Article IV.

The majority rules in all cases, except otherwise provided for in the Constitution or By-Laws; and when in these By-Laws there is a mention made of the will or determination of the Association, it must be understood as that of the majority.

Article V.

SECTION 1. The officers of this Association shall consist of a President, First Vice-President, Second Vice-President, Secretary, and Treasurer.

Selection of Officers.

SEC. 2. A committee to nominate officers for the ensuing year shall be appointed at first session, to report at next morning session.

SEC. 3. The election of officers shall be held at the morning session of the second day, and shall be conducted by balloting, unless otherwise ordered, and a majority of votes shall be necessary to a choice.

SEC. 4. All persons elected officers shall signify their acceptance within one month from date of election thereof.

SEC. 5. The election shall take place annually and at the first regular meeting after January 1st.

BY-LAWS.

Adopted January 28th, 1896, at Harrisburg, Pa.

Article I.—Meetings.

SECTION 1. The meeting of this Association shall be held annually, at such time and place as may be determined by a majority vote of the members then sitting.

SEC. 2. Special meetings may be called by the President, with the advice and consent of the Executive Committee, whenever deemed expedient, but only such business transacted as that for which the meeting was called.

Article II.—Officers and Duties.

SECTION 1. The officers of this Association shall hold office one year from the first day of January following their election, or until relieved by their duly elected successors.

SEC. 2. The duty of the President shall be to preside over all meetings and appoint all committees not otherwise provided for.

SEC. 3. The Secretary shall keep fair and correct minutes of the proceedings of the meetings, and carefully preserve on file all reports, essays, and papers received by the Association, and shall be charged with the necessary foreign and scientific correspondence.

He shall receive ten per cent. of the gross annual receipts as full compensation for his services.

Any moneys collected by the Secretary shall be immediately turned over to the Treasurer, taking his receipt for the same. He shall make an accurate and detailed report of the business of his office in time to be audited at each regular meeting of the Executive Committee.

SEC. 4. The Treasurer shall collect and take charge of the Association's funds. He shall receipt the same to the Secretary, and shall pay no money unless by order of the President and Secretary. He shall present a statement of his accounts at each meeting of the Executive Committee. He shall receive five per cent. of the gross annual receipts as full compensation for his services.

In case of the Treasurer's absence he shall appoint a deputy with full power of attorney to fulfill his duties. The Treasurer shall be required to give an indemnity bond that shall be deemed sufficient and satisfactory to the members of the Executive Committee, and said bond shall remain in the custody of the President of the Association during the term of the Treasurer in office. The Treasurer shall deliver to his successor in office all moneys, papers, vouchers, etc., in his hands.

SEC. 5. In case of the temporary absence of the President, his duties shall devolve upon one of the Vice-Presidents.

Article III.—Committees.

SECTION 1. The President, Secretary, and Treasurer shall constitute a finance committee.

SEC. 2. The Executive Committee shall consist of the President, two Vice-Presidents, Secretary, and Treasurer.

This committee shall have charge of the general affairs of the Association.

Article IV.—Trustees.

The Board of Trustees shall consist of the President, Secretary, Treasurer, and two select members.

Article V.—Quorum.

Twenty members in good standing shall constitute a quorum for the transaction of the Association's business.

Article VI.

SECTION 1. The Constitution or By-Laws may be altered or amended by a vote of three-fourths of the members present at any regular meeting. A notice to alter or amend the same shall be given at least one sitting before a vote thereon.

SEC. 2. This Association may enact such By-Laws, rules, or regulations from time to time, as it may deem proper for its good government. Provided they are not inconsistent with the provisions of the Constitution.

SEC. 3. This Association shall pay the expenses of the Executive Committee, attending meetings of the committee, the same to be paid by a draft on the Treasurer.

Article VII.

1. Opening exercises.
2. Reading minutes of previous meeting.
3. Communications, bills, etc., etc.
4. Report of regular standing committees.
5. Nomination and election of officers. See Article 5, Sections 2 and 3.
6. Reports of special committees.
7. New business.
8. Good of the Association.
9. Reading of papers, decisions, etc.
10. President's report.
11. Selection of place and time of next meeting.
12 Adjournment.

Article VII.—Parliamentary Rules.

SECTION 1. After the first session the order of business shall be determined by the nature of the subjects presented, and by the will of the majority.

SEC. 2. All questions, except the election or expulsion of members and election of officers, may be determined by yeas and nays, or by division, if necessary.

SEC. 3. Any motion duly made and seconded shall be proposed by the President, and shall then only be debatable.

SEC. 4. A motion made and seconded shall be open to discussion,

and while it is before the Association no motion shall be received unless to amend, divide, commit, or lay on table, postpone or adjourn, and a motion to adjourn shall be decided without debate.

SEC. 5. Any member who may desire to speak on any motion or resolution, shall standing address the President, and shall confine his remarks to the question at issue; avoid any offensive or personal remarks, and shall not speak more than once, and then not more than five minutes upon the same subject, unless by permission of the President.

SEC. 6. No member shall be interrupted while speaking unless by a person rising to a point of order decided by the President.

SEC. 7. During periods fixed for scientific discussion and exhibitions of specimens and processes, the ordinary rules of parliamentary bodies shall be suspended, but at other times shall be enforced by the presiding officer.

Officers.—President, M. R. Hemperley, Philadelphia; First Vice President, G. Taylor Griffin, Wilkesbarre; Second Vice President, J. B. Schreiver, Emporium; Treasurer, W. I. Goldman, Reading; Secretary, E. E. Seavey, New Castle.

The following names have been added to the roll of the Pennsylvansa State Society since its organization at Harrisburg: F. E. Gootshall, Gilbert & Bacon, E. H. Newell, Chas. E. Bayer, E. N. Bridges, Will Gray, M. G. Ritter, E. G. Mendenhall, H. B. Eggert, E. Bretney, W. D. Bishel, F. B. Clark.

To Coat Cast Iron a Glossy Black.—To coat cast iron a glossy black color that will stand washing and heat, take oil of turpentine and add to it strong sulphuric acid, drop by drop, while stirring, until a syrupy precipitate is formed and no more of it is produced on further addition of a drop of acid. The liquid is now repeatedly washed away with water, every time renewed after a good stirring, until the water does not exhibit any more acid reaction with blue litmus paper. The precipitate is next brought upon a cloth filter, and after all the water has run off, the syrup is fit for use. This thickish deposit is painted over the iron with a brush; if it happens to be too stiff, it is previously diluted with some oil of turpentine. Immediately after the iron has been painted, the paint is burnt in by a gentle heat, and after cooling the black surface is rubbed over with a piece of linen stuff dipped in and moistened with linseed oil.

Photographic Hints and Formulæ.

Indian Ink Running.—If it is for drawing plans you may prevent it running by adding a little sugar to the Indian ink.

Mucilage used on postage stamps is made from gum dextrine two parts, acetic acid one part, water five parts; dissolve, and add alcohol one part.

Drilling Glass.—Holes may be drilled in glass, says the Pharmacist, by a good steel drill wetted with a saturated solution of camphor in oil of turpentine.

A melancholy invention is that of a tombstone having a concealed door, which opening to the touch of those acquainted with its secret, discloses a photograph of the deceased.

Pencil drawings may be preserved by pouring over them, when stretched upon the drawing-board, a thin solution of gum arabic or the white of an egg dissolved in diluted ammonia water by agitation with broken glass.

Castor oil, five parts, thinned with refined petroleum one part, is a good lubricating oil for bicycles, or any other fine machinery. Good, sweet, cold-pressed lard oil mixed with petroleum in the same proportion as above is also excellent.

Making Plaster Set Quickly or Slowly.—In order to make plaster set quickly, mix it with water into which a little sulphate of potash has been dissolved. To make it set slowly, mix it with fine slaked lime. The time of setting may be regulated by changing the relative quantities.

To clean gilt frames rub with small quantity of sal volatile mixed with cold water, or after well dusting, paint the gilding with a camel's hair brush dipped in the following mixture: one gill of water in which one ounce of common salt, one ounce of alum, and two ounces of purified nitre have been dissolved.

Care of Looking Glasses.—When looking-glasses are exposed to the direct rays of the sun or to very strong heat from a fire the amalgam is apt to crystallize, and the mirror loses its brilliancy. If a mirror is placed where the rays of the sun can strike it, it should be covered in that part of the day during which it is exposed.

Natural flowers may be preserved by taking them when fresh cut and dipping them in paraffine melted enough to maintain its fluidity: move the flowers about very carefully in the liquid so as to remove all air bubbles; withdraw quickly and hold a moment to dry.

To Destroy the Odor of Paint.—To the recipes already given in past numbers may be added the following: Slice a few onions and put them in a pail of water in the centre of the room, to remain there for several hours; or plunge a handful of bay into a pailful of water and let it stand in the room over night.

A writer in a scientific monthly asks; "What is a meter?" In reply a jocular editor said; "An opinion has long prevailed that a meter is a contrivance that works twenty-seven hours a day, eight days a week the year round; and when you resolve to economize in the use of gas it throws in a couple of extra hours daily without charge."

To Clean Carpets.—The carpet being first well beaten and freed from dust, tack it down to the floor; then mix half a pint of bullock's gall with two gallons of soft water; scrub it well with soap and the gall mixture; let it remain till quite dry, and it will be perfectly cleansed, and look like new, as the colors will be restored to their original brightness. The brush used must not be too hard, but rather long in the hair, or it will rub up the nap and damage the article.

To Remove Rust.—A mixture of paraffin oil and emery powder rubbed on with a piece of tweed cloth makes steel as bright as a button. But, as "prevention is better than cure," we may add that to prevent formation of rust the bright steel should be painted with wax varnish, made by dissolving one part of solid paraffin in fifteen parts of benzole. This is a much more cleanly application than such fatty compounds as blue ointment, and is eminently suitable for steel grates, fire irons and the like.

To Remove Spots from Varnished Articles.—It depends entirely upon the nature of the substance which caused the stain. In absence of any specific knowledge on this point, we quote a method recommended in a German polytechnic journal: Make a mixture of equal parts of linseed oil, alcohol and turpentine, slightly moisten a rag with it, and rub the spots until they disappear. Then polish the spots with ordinary blotting paper. Varnish injured by heat can hardly be restored in any other way than by removing it altogether and applying a fresh coat.

About the thinnest thing in the world is the film of a soap bubble, of which it would take 50,000,000 to measure an inch.

Liquid Glue.—Four ounces hard glue, sixteen ounces acetic acid; dissolve by soaking and heating. Spaulding's glue is supposed to be ordinary glue dissolved in good, strong vinegar. Another way is to add a little pyroligneous acid to a thick solution of glue and water.

To clean marble, take two parts of common washing soda, one part of finely powdered chalk, one part of pumice stone; mix all together and sift through muslin, afterwards mix the powder with some water, rub this well on the marble, and the stains will disappear. To add a gloss wash the marble with Fuller's earth and hot water.

To Make Paste for laying Cloth or Leather.—To a pint of the best wheaten flour add resin, very finely powdered, about two large spoonfuls; of alum, one spoonful, in powder. Mix them all well together, put them into a pan, and add by degrees soft or rain water, carefully stirring it till it is of the consistence of thinnish cream; put it into a saucepan over a clear fire, keeping it constantly stirred, that it may not get lumpy. When it is of a stiff consistence so that a spoon will stand upright in it, it is done enough. Be careful to stir it well from the bottom, for it will burn if not well attended to. Empty it out into a pan and cover it over till cold, to keep it free from lumps.

To Remove Ink Stains.—Ink stains may be removed from a mahogany table by putting a few drops of spirits of nitre into a teaspoonful of water, and touching the part stained with a feather dipped into the mixture: immediately the ink stain disappears, the place must be rubbed with a rag wet with cold water or there will be a white mark which will not easily be removed. Ink stains on silver or plated articles may be removed immediately and effectually without doing any injury to the things, by making a little chloride of lime into a paste with water, and rubbing the stains until they disappear and afterwards washing the article with soap and water. Ink stains may be removed from colored table covers by dissolving a teaspoonful of oxalic acid in a teacupful of hot water and rubbing the stained part well with the solution. Ink stains may be taken out of anything white by simply putting a little powdered salts of lemon on the stain, damping it, allowing it to remain about five minutes, and then washing it out with soap and water when the stain will disappear. Ink may be removed from boards by applying some strong muriatic acid with a piece of rag and afterwards well washing the place with water.

Belitzsky's Reducer.—

Potassium ferric oxalate,	150 grains.
Sodium sulphate,	120 "
Water,	5 ounces.

dissolve and add

Oxalic acid,	10 grains.

Shake until the solution turns green, then pour off the clear solution and dissolve and add

Hypo,	100 grains.
Water,	5 ounces.

This reducer can be used immediately after fixing, or after the negative has been dried. It keeps well, and may be used over and over until it turns yellow.

Transitory Quality of Fads.—The passing of the Kate Greenaway school of art is an excellent comment on the transitory qualities of most noted fads and notions of the day. Time was, and very recently, too, when these short-waisted and long-skirted little maidens with curls, big hats and wide strings, disported themselves on every side. Pretty soon they skipped from printed page and illuminated board into actual life. Here they ran as riot as when dancing in pictures, and doting mothers rejoiced in the small daughter's artistic wear of the Kate Greenaway regalia. The inevitable reaction came, hurried somewhat by the voice of the physicians. The appeals of the little martyrs themselves against the discomfort of the dress was unheeded till the medical men said that the persistent use of the swathing skirts hindered the proper development of a child's legs. They went so far as to assert that the young woman envolved from a Greenaway-clad little girl would not have a graceful carriage. This might or might not have been true, but it served its purpose. The little girls were permitted to have their petticoats shortened and their burdensome hats lightened and made smaller, and the quaint maidens vanished from life into pictures again. Their ban pursued them even there, for less and less often were they seen, till now they are nearly an extinct race.

—*The Picture Arts.*

Binks: "Speaking of heredity, do you remember Forrester, who bought some wild land and turned it into a farm?" *Winks:* "Yes, he was the inventor of a very effective stump-puller." *Binks:* "Just so. Well, his son is a very successful dentist."—*Oakland* (Cal.) *Times.*